What is claimed is:

1. A method for generating a replacement sensor model data file for use in processing image data produced by an image sensor, the method comprising:

generating parameters of a ground-to-image transformation function based on a sensor model of the image sensor, the sensor model including support data describing physical characteristics of the image sensor;

defining adjustable parameters of the ground-to-image transformation function to reflect errors in the support data; and

generating an adjustment error covariance based on the adjustable parameters and containing information approximately equivalent to information contained in a support data error covariance,

wherein the data file includes the parameters, the adjustable parameters and the adjustment error covariance.

2. The method of claim 1, wherein the ground-to-image transformation function is a polynomial and its parameters are coefficients of the polynomial.

3. The method of claim 1, wherein the ground-to-image transformation function is a grid of ground point-image point correspondences and characteristics of the grid reflect interpolations of the grid.

4. The method of claim 1, wherein the ground-to-image function is a ratio of polynomials and its parameters are coefficients of the polynomials.

5. The method of claim 1, wherein values of the adjustable parameters are initially assumed to be zero.

6. The method of claim 1, wherein said defining adjustable parameters of the ground-to-image transformation function to reflect errors in the support data further comprises:

selecting the adjustable parameters from a pre-determined list of possible adjustable parameters.

7. The method of claim 6, wherein said generating an adjustment error covariance based on the adjustable parameters and containing information approximately equivalent to information contained in a support data error covariance further comprises:

computing the adjustment error covariance that minimizes a difference between its projection onto image space and a projection of the support data error covariance onto image space.

8. The method of claim 7, wherein the adjustable parameters are chosen so as to optimize the minimization of the difference between the projections of the two error covariances.

9. The method of claim 7, wherein the adjustments form an adjustment vector, and further wherein non-zero values of the adjustment vector are solved for and applied to a ground side or an image side of the ground-to-image transformation function, so as to reduce an effect of support data errors on future operations of the replacement sensor model.

10. The method of claim 1, wherein said generating an adjustment error covariance based on the adjustable parameters and containing information approximately equivalent to information contained in a support data error covariance further comprises:

generating a ground point grid varying in both horizontal and vertical position within a footprint of an image corresponding to the image data;

calculating a first partial derivative matrix representing an incremental change in an output of the sensor model with respect to the support data, evaluated at each ground point within the ground point grid; and

calculating a second partial derivative matrix representing an incremental change of the ground-to-image transformation function with respect to the adjustable parameters, evaluated at each ground point within the ground point grid.

11. The method of claim 10, wherein said generating an adjustment error covariance based on the adjustable parameters and containing information approximately equivalent to information contained in a support data error covariance further comprises:

generating the adjustment error covariance based on the first and second partial derivatives matrices and the support data error covariance.

12. An article of manufacture, which comprises a computer readable medium having stored therein a computer program carrying out a method for generating a replacement sensor model data file for use in processing image data produced by an image sensor, the computer program comprising:

a first code segment for generating parameters of a ground-to-image transformation function based on a sensor model of the image sensor, the sensor model including support data characterizing the image sensor;

a second code segment for defining adjustable parameters of the ground-to-image transformation function to reflect errors in the support data;

a third code segment for generating an adjustment error covariance associated with the adjustable parameters and containing information approximately equivalent to an error covariance of the sensor model; and

a fourth code segment for outputting the data file, including the parameterized ground-to-image transformation function, the adjustable parameters and the adjustment error covariance.

13. The article of manufacture of claim 12, further comprising:

a fifth code segment for selecting the adjustable parameters from a pre-determined list of possible adjustable parameters.

14. The article of manufacture of claim 12, further comprising:

a fifth code segment for selecting adjustable parameters which minimize a difference between a projection of the support data error covariance onto image space and a projection of the adjustment error covariance onto image space, whereby an optimal adjustment error covariance is generated.

15. The article of manufacture of claim 12, further comprising:

a fifth code segment for generating a ground point grid varying in both horizontal and vertical position within a footprint of an image corresponding to the image data;

a sixth code segment for calculating a first partial derivative matrix representing an incremental change in an output of the sensor model with respect to the support data, evaluated at each ground point within the ground point grid; and

a seventh code segment for calculating a second partial derivative matrix representing an incremental change of the ground-to-image transformation function with respect to the adjustable parameters, evaluated at each ground point within the ground point grid.

16. The article of manufacture of claim 15, wherein the third code segment generates the adjustment error covariance based on operations of the sixth and seventh code segments and the error covariance of the sensor model.

17. A system for permitting exploitation of imaging data by a plurality of users, the system comprising:

an image sensor;

a transmitter operable to transmit images obtained by the image sensor to the plurality of users; and

a replacement sensor model (RSM) data file generator for computing parameters of a replacement sensor model, including parameters of an adjustable ground-to-image function and an RSM error covariance associated with the adjustable function in a manner so as to reflect errors in support data describing the image sensor.

18. The system of claim 17, further comprising a rigorous sensor model that characterizes the image sensor and includes a corresponding ground-to-image transformation function, the support data and a support data error covariance.

19. The system of claim 18, wherein information contained within the RSM error covariance is approximately equivalent to information contained within the support data error covariance.

20. The system of claim 18, wherein the error covariance associated with the adjustable function is calculated using the error covariance of the rigorous sensor model.

21. The system of claim 20, wherein the RSM data file generator calculates a first partial derivative using a ground point grid varying in both horizontal and vertical position within a footprint of an image associated with the imaging data and taken with respect to the support data, and further wherein the RSM data file generator calculates a second partial derivative using the ground point grid varying in both horizontal and vertical position within the

footprint of the image associated with the imaging data and taken with respect to categories of potential adjustments to the adjustable function.

22. The system of claim 21, wherein the RSM data file generator calculates the RSM error covariance from the first and second partial derivatives and the support data error covariance.

23. A replacement sensor model, comprising:

a ground-to-image function for processing ground data obtained by an image sensor, the function being generated from data describing physical characteristics of the image sensor;

an adjustment vector for adjusting the function so as to reflect errors in the data; and

an error covariance associated with the adjustment vector that contains approximately the same information as an error covariance of a rigorous sensor model of the image sensor.

24. A method for exploiting imaging data, comprising:

inputting, into a processor,

a replacement sensor model data file containing an abstract ground-to-image transformation function for a generic image sensor, and

an image obtained by the image sensor; and

using the processor to calculate a position of a chosen ground point within the image using the data file,

wherein the data file includes parameters of the ground-to-image transformation function, an adjustment vector operable to adjust the parameters to correct for errors in the data, and an error covariance corresponding to the adjustment vector.

25. The method of claim 24, further comprising:

performing rigorous error propagation on the image data based on the error covariance corresponding to the adjustment vector.

26. The method of claim 24, further comprising:

inputting a plurality of images of a single object into the processor;

weighting the individual images based on the error covariance corresponding to the adjustment vector associated with each image; and

solving, simultaneously, for multiple ground point solutions using the plurality of images.

27. The method of claim 24, wherein said calculating a position of a chosen ground point within the image using the data file and transformation function within the processor further comprises:

solving for non-zero values of the adjustment vector reflecting corrections for the errors; and

applying the adjustment vector to the parameterized ground-to-image transformation function before solving.

28. A imaging system, comprising:

means for obtaining image data corresponding to a target object;

means for converting at least a portion of the image data into ground data specifying a location of the target object;

means for accounting for error in the image data that propagates to the ground data; and

means for quantifying an extent of the error.